

# Illuminating Terms & Graphics

**Candela** ~ the basic SI unit of luminous intensity; the luminous intensity in a given direction of a source that emits monochromatic radiation

**Golden Ratio** in design ~ an ideal based on Fibonacci. In this case the number 8, which is  $3 + 5$ .

**Lumen** (unit) ~ The lumen (symbol: lm) is the SI derived unit of luminous flux, a measure of the total quantity of visible light emitted by a source.

**Illuminance** ~ the lighting up of a surface area. It is a measure of the amount of light falling onto (illuminating) and spreading over the given surface area. It correlates with how humans perceive brightness of an illuminated area. Illuminance is often called brightness, which leads to confusion, as brightness can be used to also describe luminance. Brightness is a reference to physiological sensations and perceptions of light; it is not to be used for quantitative purposes.

The SI unit for illuminance is lux (lx). Sometimes people use the term foot-candle; foot-candle is a non SI unit of illuminance widely used in the United States. The term “foot-candle” means “the illuminance on a surface by a candela source one foot away”. One foot-candle is equivalent to one lumen per square foot which is approximately 10.764 lux.

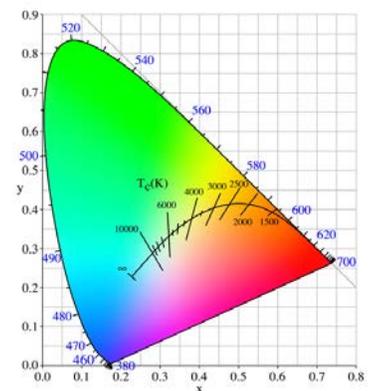
**Luminance** ~ the measure of the amount of light passing through, emitting or reflected from a particular surface traveling at a solid angle; it indicates how much luminous power can be perceived by a human eye. Thus luminance indicates the brightness of emitted or reflected surface. Luminance is used in the display industry to quantify the brightness of displays.

The SI unit for luminance is candela/square meter ( $\text{cd}/\text{m}^2$ ). There are also a variety of units used for luminance, one of the common unit used mainly in the United States is foot-lambert (fL); 1 foot-lambert (fL) equals  $1/\pi$  candela/square foot, or  $3.426 \text{ cd}/\text{m}^2$ . People in the industry will be familiar with the term nit (nt), nit is a non SI term used for luminance, and 1 nit is equivalent to  $1 \text{ cd}/\text{m}^2$ .

**Luminaire** ~ a lighting unit consisting of one or more electric lamps with all of the necessary parts and wiring.

**Illuminating Engineering Society** ~ IES (Illuminating Engineering Society of North America)

**Chromaticity** ~ the objective specification of the quality of a color regardless of its luminance. Chromaticity consists of two independent parameters, often specified as hue (h) and colorfulness, where the latter is alternatively called saturation, chroma, intensity or excitation purity. This number of parameters follows from trichromacy of vision of most humans, which is assumed by most models in color science.



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**Small Target Visibility (STV)** ~ considered a superior measurement of public lighting. First attempts at roadway lighting design focused on the output of the lighting fixtures (luminaires) and used illuminance as the salient design parameter. Later, it was recognized that drivers actually respond to the light that was reflected off objects in the road and off pavement surface, luminance, which became the standard for lighting design. Finally, lighting engineers took the problem to its next level of logical complexity by drawing the connection between luminance and the driver's eye and began searching for a method to design roadway lighting based on some component of visibility. STV is meant to relate the physics of roadway lighting performance to the biology of the human eye.

**Visibility** ~ a function of contrast. Contrast is merely the relationship between the amount of light reflected off a target and the amount of light reflected off its background. In static mode this is easily calculable, but roads support extremely dynamic conditions.

Roadstar light:

## RoadStar Architectural Roadway (GPLM)



- ✓ Better light control
- ✓ Dark-sky compliant
- ✓ Provides more lumens less glare
- ✓ Reduces number of luminaires required
- ✓ Built to last in extreme temperatures and weather conditions

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## A Sampling of Existing Lighting in Lexington Centre



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